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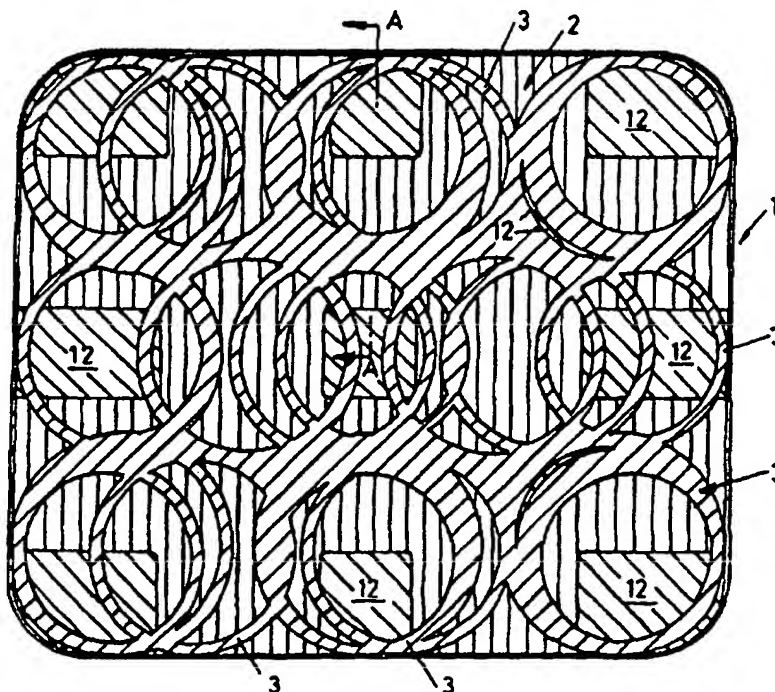
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(21) International Application Number: PCT/GB96/00265 (22) International Filing Date: 7 February 1996 (07.02.96) (30) Priority Data: 9502714.0 9 February 1995 (09.02.95) GB (71) Applicant (for all designated States except US): DAVID S. SMITH PACKAGING LIMITED [GB/GB]; 16 Great Peter Street, London SW1P 2BX (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): MAPLE, Peter, Mark [GB/GB]; 33 Kings Avenue, Marcham, Oxon OX13 6QA (GB). WILCOX, Michael [GB/GB]; 6 Blakeney Court, Oakwood, Derby DE21 2LF (GB). THOMAS, Paul, John [GB/GB]; 34 Sunny Vale, Raglan, Gwent NP5 2EF (GB). (74) Agent: JOHNSON, Terence, Leslie; Edward Evans & Co., Chancery House, 53-64 Chancery Lane, London WC2A 1SD (GB).		(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  Published With international search report.	

(54) Title: PALLET FOR CARRYING TOROIDAL OBJECTS

(57) Abstract

The invention relates to a pallet (1) for carrying toroidal objects such as wheels in a plane substantially parallel to a major surface (2) of a pallet (1), comprising location means (3) whereby a plurality of wheels (which are not shown) of different diameter can be located on the pallet (1). The pallet (1) is in the embodiment made of plastic, suitably double wall plastic, and has channels (not shown) for receiving tines of a fork-lift truck or the like. The location means (3) comprises step means (4, 5, 6) defined by arcs of different radii. The different radii arcs (3) intersect so that the step means (4, 5, 6) provide in the embodiment three different levels, and therefore it is possible to carry on the pallet (1) wheels of three different diameters.



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## PALLET FOR CARRYING TOROIDAL OBJECTS

The invention relates to a pallet, and particularly to a pallet, often known as a wheel pack or tray, which is used to transport toroidal objects such as wheels or wheel hubs.

Wheels or wheel hubs, made of metal such as steel or aluminium, have defined diameters, and are required to be transported for example to automobile manufacturers from component manufacturers. The wheels are required to be transported without damage so that they remain true and thus remain of the designed shape and configuration so that they can be fitted with tyres, brakes etc. and also so that in use they run truly for to do otherwise would be dangerous.

Pallets have therefore been produced which can provide protection for the wheels during transport. However, wheels and wheel hubs are produced in a variety of different diameters for different applications and therefore a great many pallets are required to accommodate such variations. This is expensive and also wastes space.

It is accordingly an object of the invention to seek to mitigate these disadvantages.

According to the invention there is provided a pallet for carrying toroidal objects in a plane substantially parallel to a major surface of the pallet, comprising location means whereby a plurality of objects of different diameter can be located on the pallet.

The location means may comprise raised step means, or alternatively, recess

means. This provides a relatively simple yet efficient alternative means of locating a device such as a wheel in place.

The location means may comprise intersecting arc means of different radii. This provides for the holding of different size wheels on the pallet.

The arc means may be so disposed and arranged as to be able to locate objects of three discrete diameters. This is a preferred arrangement.

The arc means may each be associated with a surface profile adapted to prevent lateral shifting of an object. This provides for a positive location on the pallet.

The surface profile may be planar. This provides for ease of manufacture.

The major surface may comprise three discrete levels. This again is for accommodating different size wheels. Thus the location means may provide for three different diameters at three different heights on the pallet. This provides for flexibility in stacking on a pallet.

There may be location means for nine discrete objects.

There may be a pallet as hereinbefore defined, having mounted thereon a plurality of wheel hubs.

There may be a pallet as hereinbefore defined in combination with a cover or tray, the cover or tray comprising location means whereby a plurality of objects of different diameter can be located under the cover or tray.

A pallet for carrying toroidal objects such as wheels in a plane substantially

parallel to a major surface of the pallet is hereinafter described, by way of example, with reference to the accompanying drawings.

Fig. 1 is a plan view of a pallet according to the invention:

Fig. 1A shows a legend used in Fig. 1; and

Fig. 2 is a sectional view on line A-A of Fig. 1.

Referring to the drawings, there is shown a pallet 1 for carrying toroidal objects such as wheels in a plane substantially parallel to a major surface 2 of the pallet 1, comprising location means 3 whereby a plurality of wheels (which are not shown) of different diameter can be located on the pallet 1.

The pallet 1 is in the embodiment made of plastic, suitably double wall plastic, and has channels (not shown) for receiving tines of a fork-lift truck or the like. The location means 3 comprises step means 4, 5, 6 defined by arcs of different radii. The different radii arcs 3 intersect so that the step means 4, 5, 6 provide in the embodiment three different levels, and therefore it is possible to carry on the pallet 1 wheels of three different diameters.

The pallet 1 can carry wheels of all one diameter, of all a second diameter, or of all a third diameter. Alternatively, the pallet can carry a "mix" of wheels or two or three distinct diameters.

This is achieved by placing a wheel down on the pallet 1, so that it fits snugly in a notional circle or recess defined by an appropriately selected set of arcs which have their bases defined at the same level in the pallet substantially parallel to a major surface thereof. This is clearly shown in Fig. 2 where from

an edge 7 of the pallet, there is a bottom level 8, a middle level 9, a top level 10, a bottom level 8, a top level 10 and a middle level 9, reading along line A-A. The radii of the arcs 3 thus define circles, for example a small diameter circle, a middle diameter circle and a large diameter circle, for accommodating the three different diameter wheels. There are walls 11 between the different levels, the walls 11 forming surface profiles which locate the wheels and prevent lateral movement thereof.

There are also other surface profiles 12 in the pallet 1 which also prevent lateral movement of wheels stacked on the pallet 1. The profiles 12, like the tops of the arcs, are planar.

Thus the pallet 1 provides universality in being able to mount securely and without lateral shifting, wheels of different diameter, in the embodiment, of three different diameters.

It will be understood that there may be a cover or tray (not shown) having on its underside (in use) location means 3 identical to those shown on the pallet 1, so that a cover may be set down on the wheels, to form a pallet set. Also, the cover may have on its upper (in use) side or major surface location means as described for the pallet 1, so that a further layer of wheels may be carried on the cover, which now acts as a tray, which itself may have a cover, and so on.

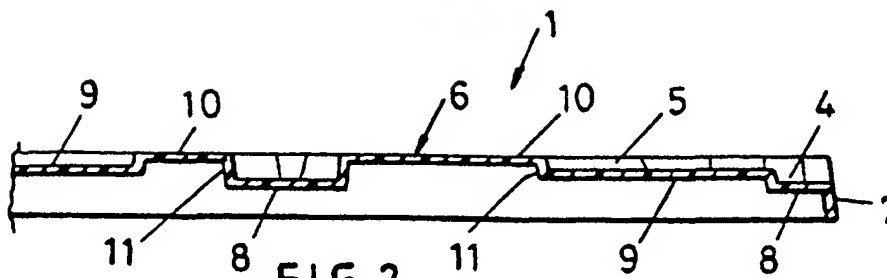
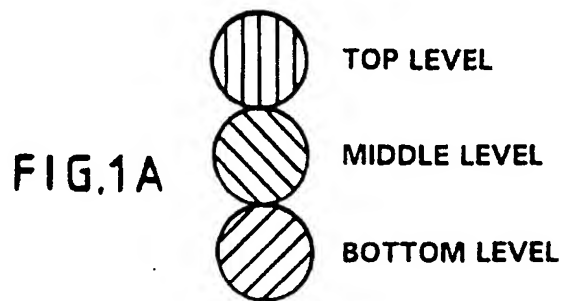
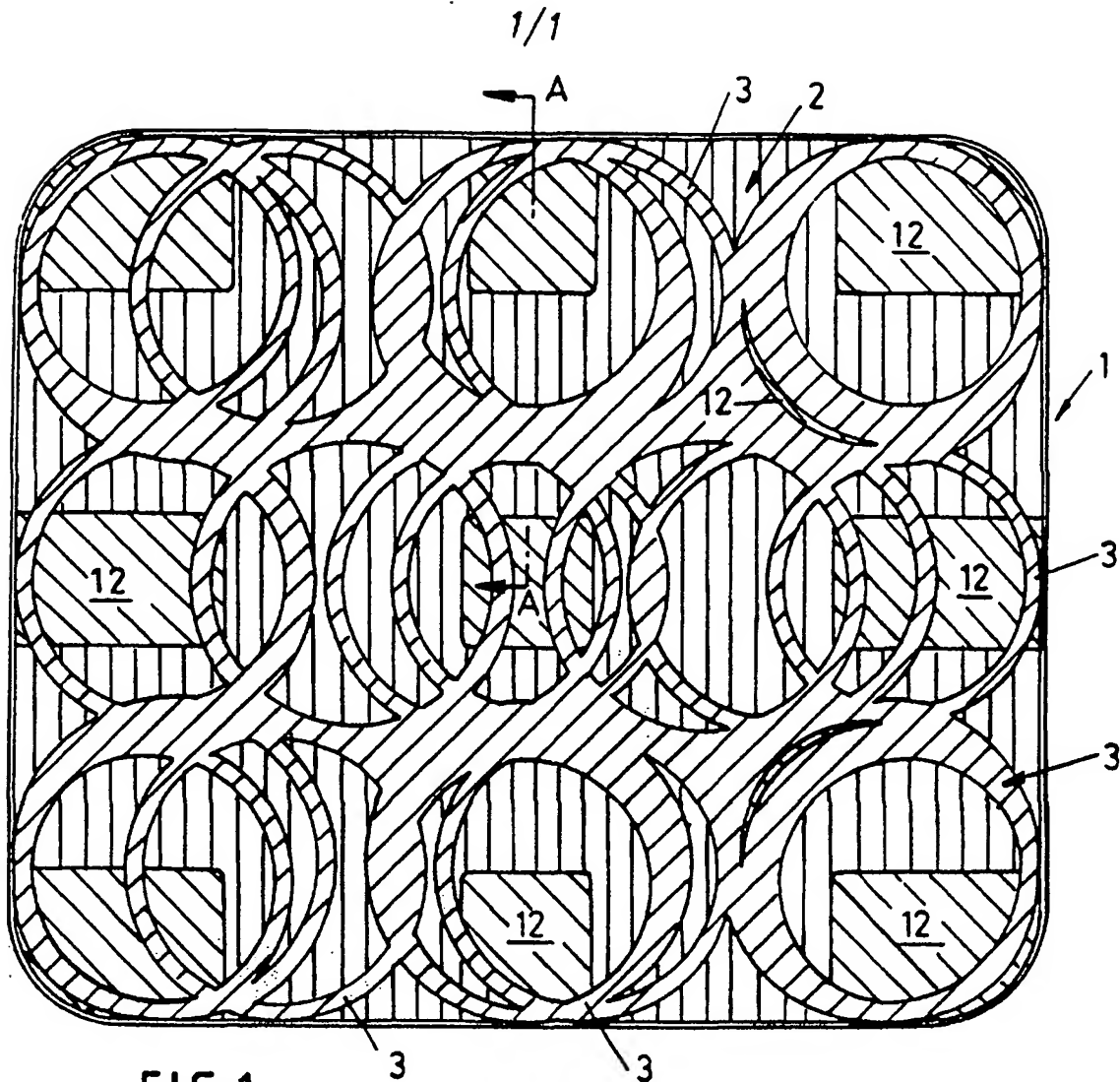
CLAIMS

1. A pallet for carrying toroidal objects in a plane substantially parallel to a major surface of the pallet, comprising location means whereby a plurality of objects of different diameter can be located on the pallet.
2. A pallet according to Claim 1, the location means comprising raised step means.
3. A pallet according to Claim 1, the location means comprising recess means.
4. A pallet according to Claim 2 or Claim 3, the location means comprising intersecting arc means of different radii.
5. A pallet according to Claim 4, the arc means being so disposed and arranged as to be able to locate objects of three discrete diameters.
6. A pallet according to Claim 5, the arc means each being associated with a surface profile adapted to prevent lateral shifting of an object.
7. A pallet according to Claim 6, the surface profile being planar.
8. A pallet according to Claim 7, the major surface comprising three discrete levels.
9. A pallet according to any preceding claim, comprising location means for nine discrete objects.

10. A pallet according to any preceding claim, having mounted therein a plurality of wheel hubs.

11. A pallet according to Claim 10, in combination with a cover or tray, the cover or tray comprising location means whereby a plurality of objects of different diameter can be located under the cover or tray.





SUBSTITUTE SHEET (RULE 26)

## INTERNATIONAL SEARCH REPORT

Int. Application No

PCT/GB 96/00265

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 B65D19/44

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE,A,42 29 698 (PETRA GMBH) 10 March 1994 see the whole document	1,2,9
X	US,A,2 444 326 (BAKER) 29 June 1948 see the whole document	1-11
X	GB,A,2 175 878 (DIAMONITE PRODUCTS LTD) 10 December 1986 see the whole document	1-3

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A-4229698	10-03-94	NONE	
US-A-2444326	29-06-48	NONE	
GB-A-2175878	10-12-86	NONE	

Form PCT/ISA/210 (patent family annex) (July 1993)